Statistical Bulletin
METROPOLITAN LIFE INSURANCE COMPANY
Volume 41 March 1960

Mortality Among Overweight Women*

OVERWEIGHT adversely affects the health and longevity of women, although to a lesser extent than in men.† New information on the mortality of overweight women is available from the Build and Blood Pressure Study, 1959, of the Society of Actuaries, which included the experience of women aged 15-69 years accepted for Ordinary insurance in the period 1935-53 and traced to the anniversary of their policies in 1954. Although all these women were given medical examinations at the time they applied for insurance, the examinations were generally less extensive than those of men.

Table 1 shows the extent to which mortality among insured overweight women is greater than that for all women insured as standard risks, according to degree of overweight and age at application for insurance. In the broad age range 15-69 years, the mortality for women 10 percent or more overweight was 18 percent in excess of that for standard female risks; for women 20 percent or more overweight, the excess was 25 percent. The excess mortality rose steadily with increase in degree of overweight—from 9 percent for women 10 percent overweight, to 30 percent for those 30 percent overweight. The findings for obese women, moreover, understate their true mortality inasmuch as they were subject to careful selection.

Women apparently withstand the effects of overweight better than men do. For any degree of overweight, the excess mortality among women is less than it is among men. For example, for women who at issue ages 15-39 years were 20 percent overweight, the mortality was 15 percent above that for all standard female risks; the comparable group of men had a mortality 24 percent higher than that for all standard male risks. A major reason for this difference is that normal variation in weight

*This is the fourth of a series of articles dealing with the major findings and implications of the *Build and Blood Pressure Study, 1959*, recently published by the Society of Actuaries. This investigation covered the experience of several million people insured by 26 large Life insurance companies in the United States and Canada during the period 1935-53.

†"Mortality Among Overweight Men," *Statistical Bulletin*, February 1960.

is relatively greater for women than for men.

Overweight women in every age period have a higher mortality than those whose weight is close to average, the excess mortality increasing with advance in age. Thus, for women who were in the age range 15-39 years and 10 percent or more overweight when insured, the mortality was 14 percent above that for standard female risks at these ages; in like manner, the excess mortality for women at ages 40-69 was 23 percent. For the younger women 20 percent or more overweight, the corresponding excess mortality was 21 percent, and for the older women 32 percent. The degree of excess mortality among overweight women did not vary significantly according to height.

The disadvantage of overweight in women shows up even more distinctly when their mortality is compared with that of moderately underweight women who experienced the lowest mortality. On this basis, the excess mortality at issue ages 15-69 was more than 30 percent for women who were 10 percent or more overweight, and about 40 percent for those who were 20 percent or more overweight.

As the lower tier of Table 1 indicates, even for overweight wom-

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TABLE 1—MORTALITY AMONG OVERWEIGHT WOMEN

Excess Mortality (Percent)* for Various Degrees of Overweight

Cases Accepted for Ordinary Insurance in 1935-53, Traced to Policy Anniversary in 1954. By Age at Issue

Age Group at Issue	Deviation Above Average Weight				
	10% or More	20% or More	10%	20%	30%
All Cases†					
Ages 15-69	18	25	9	21	30
15-39	14	21	7	15	22
40-69	23	32	11	25	36
Cases Without Known Minor Impairments					
Ages 15-69	9	15	2	11	20
15-39	6	12	1	6	12
40-69	13	20	3	15	25

*Compared with all women insured as standard risks.
†With and without minor impairments.
Source: Derived from *Build and Blood Pressure Study, 1959*, Society of Actuaries.
Note: All the overweight women included in this table were insured either as standard risks, or were rated as substandard risks only because of weight, having no other impairment that would bar them from obtaining standard insurance.

TABLE 2—CAUSES OF DEATH WITH EXCESS MORTALITY AMONG OVERWEIGHT WOMEN

Excess Mortality for Specified Causes Among Women Approximately 15 Percent or More Above Average Weight. Ages 15 to 69 at Issue

Cases Accepted for Ordinary Insurance in 1935-53 Traced to Policy Anniversary in 1954

Cause of Death	Excess Mortality (Percent)*	
	All Cases†	Cases Without Known Minor Impairments
Cardiovascular-renal diseases		
Heart and circulatory diseases	51	25
Coronary artery disease	35	10
Vascular lesions of central nervous system	29	2
Malignant neoplasms	13	8
Diabetes mellitus	83	50
Pneumonia and influenza	27	12
Diseases of digestive system	39	19

*Compared with all women insured as standard risks.
†With and without minor impairments.
Source: Derived from *Build and Blood Pressure Study, 1959*, Society of Actuaries.
Note: All the overweight women included in this table were insured either as standard risks or were rated as substandard risks only because of weight, having no other impairment that would bar them from obtaining standard insurance. The original data of the study do not permit direct computation of mortality by cause for specific degrees of overweight.

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en who were reported to have had no known minor impairments* when insured, the mortality is higher than the average for all women accepted for Ordinary insurance. For those 10 percent or more overweight, the excess was 9 percent at issue ages 15-69, and 15 percent for those 20 percent or more overweight. In general, the pattern of mortality is similar to that in the upper tier of the table, but the figures are consistently at a lower level. The women without known minor impairments who were 10 percent overweight show little increase over average mortality, although about 10 percent higher than the death rates for underweight women with lowest mortality.

The elevated mortality of overweight women is due primarily to the excess toll from the cardiovascular diseases; this is evident from Table 2, which is limited to the experience of women about 15 percent or more overweight. Although heart disease accounts for a much smaller proportion of the total mortality among women than among men—the proportions being a little

*A number of the women in this study, in addition to being overweight at the time they were insured, had some minor impairment, such as slight elevation of blood pressure, or minor circulatory or urinary impairments. None of these impairments, however, would bar the women from obtaining standard insurance. In fact, even the overweight women who were rated as substandard risks were so classified only because of their weight; in all other respects they were considered to be average or better risks.

more than one fourth and nearly half, respectively—the heart disease death rate among the overweight women is about 50 percent above that for standard female risks. The mortality from vascular lesions of the central nervous system (including cerebral hemorrhage and thrombosis) shows an excess of nearly one third. For malignant neoplasms, the leading cause of death among women in the age range covered by this insurance experience, the mortality is about one eighth higher than that for all women accepted as standard risks. Diabetes, though a less important cause of death, shows relatively the greatest degree of excess mortality—nearly double the expected. The mortality from digestive tract disorders is also elevated, primarily reflecting above-average frequency of gallstones and other biliary tract and liver disorders.

The splendid health record of women in the general population of the United States and Canada—about the best in the world—could be further improved if overweight women shed their excess weight. This, it is expected, would reduce their mortality from cardiovascular disease, diabetes, and other conditions which account for the excess mortality of overweights. Indeed, the control of the conditions in which overweight plays a distinct role offers the best prospects for further substantial reduction in the already low death rate of women.

Disability Experience in 1959

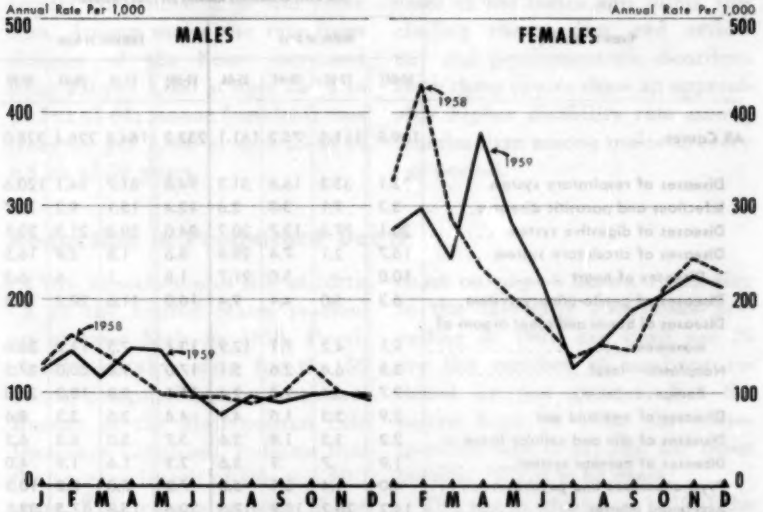
IN 1959, the incidence of disability lasting eight days or more was practically the same as in 1958 among Metropolitan Life Insurance Company office and field personnel covered by the Company's Group insurance program. New cases of disability occurred at the rate of 157 per 1,000 personnel in 1959, compared with 158 the year before. In both these years, the rate was somewhat lower than that (169 per 1,000) in 1957, but was considerably above the rate in 1956—144 per 1,000. The relatively high incidence of disability in the past three years is largely a consequence of the widespread prevalence of upper respiratory disease in the later months of 1957 and in the early months of 1958 and 1959. (See chart on page 5.)

While the disability rate among women aged 17-59 years increased 2 percent between 1958 and 1959, it decreased 4 percent among males aged 17-64. These divergent trends widened the sex difference in the incidence of disability. As the table on page 6 shows, the rate was more than 1½ times as high for women as for men under age 25, about 3 times as high at ages 25-44, and slightly over twice as high at ages 45 and over. The variation in these ratios reflects differences in

MONTHLY VARIATION IN INCIDENCE OF DISABILITY,* 1959 AND 1958

Males, Ages 17-64; Females, Ages 17-59†

Personnel of the Metropolitan Life Insurance Company



*The date of onset of disability is that on which the person first received payment of a disability benefit under the Company's Group insurance plan; this excludes the first seven days of disability. The data thus relate to disability lasting eight days or more. Personnel in the Pacific Coast States and Canada are not included.

†Normal retirement age is 65 years for men and 60 years for women.

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the age pattern of disability for the two sexes. For females, the rates in 1959 rose progressively with advance in age from 185 per 1,000 at ages 17-24 to 328 at ages 45-59. For males, in contrast, the rate fell from 112 per 1,000 at ages 17-24 to 75 at ages 25-44, then rose to 161 per 1,000 at ages 45-64.

In 1959, for the third successive year, the diseases of the respiratory system outranked the other causes of disability lasting eight days or more. These diseases accounted for two fifths of all new cases of disability among females and for about one fifth of the total among males. The disability rate from the respiratory diseases was considerably higher for women than for men at every age period; at ages 25-44 the ratio was more than 5 to 1 and almost as high at subsequent ages.

Diseases of the digestive system ranked second as a cause of disability in each sex, with rates of 24.0 per 1,000 for women at ages 17-59 and 20.1 for men aged 17-64 years. Females experienced a higher rate than males at every age period but particularly at ages 25-44.

INCIDENCE OF DISABILITY FROM SPECIFIED CAUSES BY SEX AND AGE

Personnel of the Metropolitan Life Insurance Company,* 1959

Cause of Disability	New Cases of Disability Annually per 1,000 Personnel†							
	Males, at Ages				Females, at Ages			
	17-64‡	17-24	25-44	45-64	17-59‡	17-24	25-44	45-59
All Causes	109.6	111.8	75.2	161.1	232.2	184.8	228.4	328.0
Diseases of respiratory system	23.1	33.3	16.8	31.3	94.8	81.7	94.1	120.6
Infectious and parasitic diseases	3.2	7.1	3.3	2.6	12.4	15.1	9.3	10.7
Diseases of digestive system	20.1	17.0	13.7	30.2	24.0	20.8	21.5	33.1
Diseases of circulatory system	15.7	2.1	7.4	29.8	6.6	1.8	5.9	16.5
Diseases of heart	10.0	—	3.0	21.7	1.8	.1	.6	6.3
Diseases of genito-urinary system	6.3	5.0	4.4	9.4	16.0	11.6	20.2	19.8
Diseases of bones and other organs of movement	9.1	4.2	7.1	12.9	13.1	7.3	11.2	26.6
Neoplasms—total	3.8	6.4	2.6	5.1	17.0	9.8	20.0	27.5
Benign	2.7	6.4	2.6	2.4	15.6	9.8	18.3	23.8
Diseases of eye and ear	2.9	3.5	1.5	4.9	4.8	2.5	5.3	8.6
Diseases of skin and cellular tissue	2.2	3.5	1.8	2.6	5.7	5.0	6.3	6.5
Diseases of nervous system	1.9	.7	.9	3.6	2.3	1.6	1.9	4.0
Psychoneuroses and psychoses	4.0	1.4	3.1	5.8	7.2	5.0	8.2	10.5
Accidental injuries	14.2	26.2	10.9	17.5	20.6	15.8	17.5	33.1
All other causes	3.1	1.4	1.7	5.4	7.7	6.8	7.0	10.5

*Personnel in the Pacific Coast States and Canada are not included.
†The data relate only to disability lasting eight days or more.
‡Normal retirement age is 65 years for men and 60 years for women.

Accidental injuries were third in rank as a cause of disability among women and fourth among men. The two sexes differ sharply in the age distribution of disability cases from this cause; among men, the peak rate is at the ages under 25, while among women it is at ages 45 and over. More detailed analysis of the records shows that the major types of accidental injury—sprains and strains, contusions, fractures, and lacerations—are considerably more frequent among males than females under age 25 but that the pattern is reversed beyond this age.

Disability caused by neoplasms and by diseases of the genito-urinary system is much more common among women than among men. For example, the disability rate from benign tumors—which account for the large majority of all neoplasms—is 7 times as high among females as among males at ages 25-44 and 10 times as high at ages 45 and over.

In contrast, the disability rate from diseases of the circulatory

system—particularly heart disease—is markedly higher for men than for women. In both sexes cases are largely concentrated at the older ages. Among males the rate from diseases of the heart increased from 3.0 per 1,000 at ages 25-44 to 21.7 at 45-64; among females it rose from 0.6 per 1,000 at ages 25-44 to 6.3 at 45-59 years.

Among the remaining causes of disability in this insurance experience, the most prominent are diseases of the bones and joints (including rheumatism and arthritis) and psychoneurotic disorders. Both these causes show an appreciably higher disability rate among females than among males at every age period.

Reduction in Premature Death

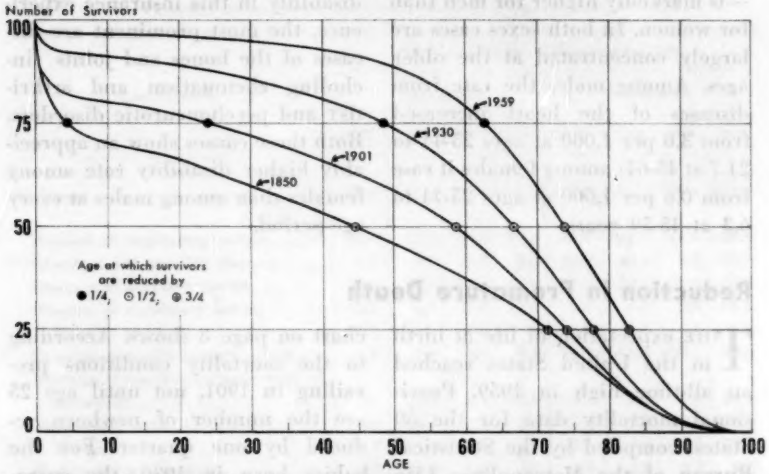
THE expectation of life at birth in the United States reached an all-time high in 1959. Provisional mortality data for the 50 States, compiled by the Statistical Bureau of the Metropolitan Life Insurance Company, indicate that the average length of life was 69.7 years. This compares with about 69.5 years in 1958 and with the previous high of 69.6 years registered in 1954 and in 1956; the figures prior to 1959 do not include Alaska and Hawaii.

The favorable longevity now enjoyed by the American people reflects the marked rise in living standards and the extraordinary advances in medical science and public health administration. Not many generations ago, the infectious diseases took a heavy toll of life year after year and not infrequently flared to epidemic proportions. The death toll was particularly heavy among young children. For example, in 1850 about one fourth of the newborn died before reaching their fifth birthday, as the chart on page 8 shows. According to the mortality conditions prevailing in 1901, not until age 25 are the number of newborn reduced by one quarter. For the babies born in 1930, the corresponding age is 49, and for those born in 1959 it is 63 years.

The age to which one half of the newborn survive has also increased substantially. Thus, according to the mortality prevailing around 1850, one half of the babies lived to celebrate their 45th birthday. That point advanced to about 58 years by the turn of the century, and reached age 67 in 1930. Under current conditions, one half of our newborn may expect to live almost 74 years.

The smallest gains are shown for the age at which the survivors from birth have been reduced by three quarters, due largely to our relatively slow progress in controlling malignancies, cardiovascular-renal conditions and the other degenerative diseases of middle and later life. Even so, one quarter of the

SURVIVORS FROM BIRTH TO SUCCESSIVE AGES, UNITED STATES, 1850-1959



Source of life tables: 1850, based on Paul H. Jacobson, "An Estimate of the Expectation of Life in the United States in 1850," *Milbank Memorial Fund Quarterly*, 35:197-201, April 1957; 1901, from Bureau of the Census, *United States Life Tables, 1890-1910*; 1930 (Death Registration States of 1929) and 1959 (50 States, provisional), from Statistical Bureau of the Metropolitan Life Insurance Company.

babies born in 1959 can expect to live 83 years—an increase of 11 years over the figure for those born in 1850.

It is doubtful whether the record of life conservation during the past century will ever again be paralleled. It should be noted that there has been virtually no improvement in longevity since 1954. Some additional gains may be expected from continued declines in the death rates from tuberculosis, pneumonia and other infectious diseases; the toll from accidents may also be reduced. However, the greatest margin for improvement lies in the development of new weapons for postponing and treating the degenerative conditions, which now predominate at the middle and older ages.

The Frequency of Accidental Poisoning

FATALITIES resulting from accidental poisoning by solids and liquids have been decreasing in relative frequency in the United States — from 11.0 per 1,000,000 population in 1949 to 8.2 in 1957. The improvement reflects a reduction in the death rate from poisoning at every age period.

Children at the preschool ages account for one fourth of the approximately 1,400 deaths from ac-

cidental poisoning by solids and liquids which occur annually in the United States; the toll is particularly high between ages 1 and 2. As the accompanying chart shows, the mortality from accidental poisoning is also comparatively high among infants. The death rate is at a minimum during the school ages and rises to a secondary peak at ages 45-64.

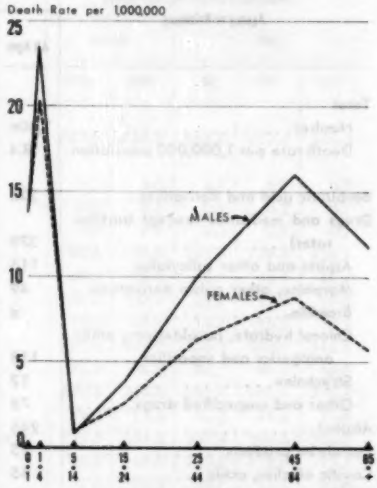
Fatal poisonings are considerably more frequent among males than among females, the death rates at all ages combined being 10.1 and 6.7 per 1,000,000, respectively, in 1956-57. Under age 15 the sex difference in mortality is small, but in the age range 15-44 the death rate for males is about 1½ times that for females; at ages 45 and over the ratio is about 2 to 1.

Barbituric acid and its derivatives are a major cause of fatal accidental poisoning. As may be seen in the table on page 10, they are responsible for nearly 1 out of every 4 deaths from poisoning. Very few of the fatalities from the accidental ingestion of barbiturates occur under age 25, the large majority of them being concentrated in the age range 25-64 years. Barbiturate poisoning takes a somewhat greater toll among women than men. California residents, curiously, account for about one third of the reported deaths from barbiturates in the United States.

Drugs and medicines, other than the barbiturates, accounted for 27 percent of the fatal poisonings in

MORTALITY FROM ACCIDENTAL POISONING BY SOLIDS AND LIQUIDS

Males and Females by Age
United States, 1956-57



Source of basic data: Reports of National Office of Vital Statistics.

the United States in 1956-57. The bulk of these deaths were due to the ingestion of aspirin and other salicylates and to overdoses of chloral hydrate, paraldehyde, and other analgesics and soporifics. Of particular significance is the relatively large number of fatalities caused by aspirin and other salicylates among young children. More than half the deaths from these drugs were at ages 1-4 years; an appreciable number also occurred among infants. On the other hand, chloral hydrate and similar drugs took their largest toll at ages 25-64.

The ingestion of wood, denatured, and other alcohols is the

MORTALITY FROM ACCIDENTAL POISONING BY SOLIDS AND LIQUIDS

Total Persons, by Age. United States, 1956-57

Agency of Poisoning	Average Annual Number of Deaths							
	All Ages	Under 1	1-4	5-14	15-24	25-44	45-64	65 and Over
Total								
Number	1,406	51	333	27	69	379	421	124
Death rate per 1,000,000 population	8.4	13.8	21.9	.9	3.2	8.2	12.3	8.5
Barbituric acid and derivatives	325	2	9	4	16	124	139	32
Drugs and medicines (except barbiturates)	379	28	106	7	27	93	88	38
Aspirin and other salicylates	116	16	64	4	1	8	15	10
Morphine, other opium derivatives	49	1	2	—	17	21	7	2
Bromides	8	1	1	—	—	1	3	3
Chloral hydrate, paraldehyde, other analgesics and soporifics	118	4	7	1	5	47	45	11
Strychnine	12	—	3	1	1	2	4	2
Other and unspecified drugs	76	6	29	1	3	14	14	10
Alcohol	246	1	2	1	11	107	112	12
Petroleum products	85	8	67	3	1	2	3	2
Caustic alkalies, acids	45	3	10	—	3	5	13	12
Carbon tetrachloride, turpentine, etc.	45	—	9	1	2	12	19	4
Lead and compounds	49	1	35	1	—	3	6	4
Arsenic, antimony, and compounds	48	2	28	1	1	9	6	2
Mercury and compounds	9	1	1	—	2	2	3	2
Other and unspecified	179	8	70	11	10	26	36	18

Source of basic data: Reports of the National Office of Vital Statistics.

leading cause of accidental poisoning among men. More than 80 percent of the deaths from alcohol poisoning are among males, a higher proportion than for any other type of accidental poisoning.

Kerosene and other petroleum products, lead and its compounds, and household pesticides containing arsenic compounds or other lethal ingredients, all contribute materially to the death toll from poisoning. Children of preschool age are the chief victims.

The most significant measure taken in recent years to reduce the toll of accidental poisoning has been the establishment of poison control centers in major cities throughout the United States. These centers—most of which maintain a 24-hour telephone service—make available to physicians information on the toxic ingredients of household products and on antidotes for them, so that proper treatment may be administered as soon as possible.

MORTALITY FROM SELECTED CAUSES

Industrial Policyholders, Metropolitan Life Insurance Company
January 1960

Cause of Death	Annual Rate per 100,000 Policyholders*				
	January		Year		
	1960†	1959†	1959†	1958	1957
All Causes	723.9	739.2	665.3	662.4	656.8
Tuberculosis (all forms)	4.2	5.6	5.7	6.7	6.7
Communicable diseases of childhood	0.2	0.2	0.1	0.2	0.1
Acute poliomyelitis	0.2	0.1	0.2	0.1	0.1
Malignant neoplasms	144.6	152.8	141.9	139.8	136.1
Digestive system	48.1	52.6	48.1	46.8	46.9
Respiratory system	20.8	23.9	21.2	19.9	19.0
Diabetes mellitus	16.0	17.6	14.7	15.2	15.2
Diseases of the cardiovascular-renal system	395.3	404.0	355.5	352.0	348.6
Vascular lesions, central nervous system	72.5	78.7	67.7	66.5	66.5
Diseases of heart	295.2	294.2	261.5	260.4	256.2
Chronic rheumatic heart disease	11.4	11.6	10.8	11.4	11.6
Arteriosclerotic and degenerative heart disease	238.3	234.8	207.9	206.5	200.5
Diseases of coronary arteries	140.2	147.6	123.8	118.7	113.7
Hypertension with heart disease	32.0	35.3	30.6	31.5	33.6
Other diseases of heart	13.5	12.4	12.2	10.9	10.5
Nephritis and nephrosis	7.5	8.9	7.1	7.4	8.2
Pneumonia and influenza	23.2	20.5	18.5	20.3	20.0
Complications of pregnancy, childbirth	0.7	0.6	0.8	0.8	0.9
Suicide	5.9	6.8	6.5	6.1	5.7
Homicide	3.4	2.8	2.8	2.9	2.9
Accidents—total	35.0	37.8	33.1	34.2	34.9
Motor vehicle	16.9	18.2	14.6	14.8	15.3
All other causes	95.2	90.4	85.5	84.1	85.6

*These death rates relate to persons insured under Weekly or Monthly premium-paying policies for small amounts of insurance.

†Beginning with January 1959, deaths have been classified according to the Seventh Revision of the International List of Causes of Death. Consequently, the death rates for individual causes in 1959 and 1960 are not strictly comparable with those for earlier periods. Rates for 1960 are provisional.

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MORTALITY FROM ALL CAUSES

INDUSTRIAL POLICYHOLDERS · METROPOLITAN LIFE INSURANCE COMPANY

P.F.M.—Printed in U.S.A.—40260—(3-60)

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